

Our Ref.: 871-80
TT/20/US

U.S. PATENT APPLICATION

Inventor(s): Guy Nathan
Ken Phillips
Dominique Dion
Mounir Khenfir

Invention: DOWNLOADING FILE RECEPTION PROCESS

***NIXON & VANDERHYE P.C.
ATTORNEYS AT LAW
1100 NORTH GLEBE ROAD
8TH FLOOR
ARLINGTON, VIRGINIA 22201-4714
(703) 816-4000
Facsimile (703) 816-4100***

SPECIFICATION

DOWNLOADING FILE RECEPTION PROCESSField of the invention

The present invention relates to a file reception process applied to an audiovisual data reproduction system.

5

Background of the invention

In the prior art, file reception processes comprising a first step, wherein the file(s) received are stored in memory in a file located in a temporary storage area, are known. Then, a specific procedure checks whether the file(s) received correspond to the file(s) expected. If this is the case, according to the type of file, the files received are copied to a specified permanent storage area.

10
15Objects and summary of the invention

Therefore, the purpose of the present invention is to remedy the disadvantages of the prior art by proposing a file reception process no longer requiring temporary file storage.

20

This purpose is achieved by a process for receiving files sent by a central server to an audiovisual data reproduction system, managed by an operating system and linked to the server, by means of a data transfer link, characterised in that the process comprises:

25

- a step consisting of initialising a link between the central server and an audiovisual data reproduction system,

- a step consisting of storing files sent by the central server on storage means of the audiovisual data

30

reproduction system, each file comprising specified information representative of the type of data contained in the file,

- a step consisting of searching, for each file received, a specific reception function, this search step being carried out by means of the specified information representative of the type of data contained in the file,

- a step consisting of processing each file by the corresponding reception function, the processing comprising copying of the file received to a specified storage area.

Brief description of drawings

The invention, with its characteristics and advantages, will be understood more clearly upon reading the description given with reference to the appended drawings, wherein:

- figure 1 represents a logic diagram of the file reception process according to the invention,
- figure 2 represents a logic diagram of a representative song file reception function,
- figure 3 represents a logic diagram of a representative album cover file reception function.

Description of the preferred embodiments

The file reception process according to the invention is implemented by an audiovisual data reproduction system such as that described in the European patent application No. 99 401 785.3. According to this European patent application, the reproduction system essentially comprises a central processing unit managing, by means of a plurality of interfaces and an

operating system, sound reproduction, image display, song selection and a link with a remote audiovisual data distribution server. The operating system is organised in hierarchical modules each managing a specific function of the audiovisual data reproduction system.

The operating system of such an audiovisual data reproduction system also manages a database. This database contains data on the files stored on the reproduction system's storage means. These files particularly represent, either digitised data forming songs, or graphic data representing the cover of the albums from which the songs are taken, or animations (video or advertising). For example, there are at least two types of graphic files. The first type of graphic file represents the album cover in a small format. This first type of graphic file is used during a customer's search in the list of songs available on the reproduction system. The second type of files represents the album cover in a large format. This second type of file is used when the customer has selected a song taken from the album corresponding to the cover. The third type of file may be a video, advertisement or survey. The different file types, song files, graphic files of the first and second types, are differentiated using a different file extension for each file type.

The data contained in the database is used to determine the links existing between the song files and the associated graphic files, such that all song files are linked to at least one graphic file. However, graphic files representing the album cover may not be linked to any song file. This means that the songs in the album represented by the cover are not stored on the

reproduction system but may be ordered in order to be downloaded onto the reproduction system's storage means. Similarly, new songs with their corresponding album sleeve may be ordered in order to be downloaded onto the reproduction system's storage means. It is during the downloading of the files corresponding to the songs or album sleeves that the process according to the invention is implemented.

When new songs are ordered using an audiovisual data reproduction system, the operating system of the reproduction system checks whether, for the new song, a graphic file, representing the album cover, is already stored on the storage means. If this is not the case, the corresponding graphic file(s) is/are also ordered. For each file ordered, a function intended to process and handle the file ordered is created by a module of the operating system supervising the type of file ordered. In this way, the operating system comprises a first module managing song files, a second module managing the first type of graphic files, a third module managing the second type of graphic files and other modules managing the other file types. In the rest of this document, the operation will be described with three different file types. However, this does not represent a limitation of the present invention. In this way, during the order, for example of a specified song file, the first module creates a specific reception function for the song files ordered. To do this, the database comprises the name of all the files of all the songs available on the reproduction system and the name of all the files of all the downloadable songs. In this way, for each file ordered, the reception function is created.

Similarly, the first, second and third modules comprise a function creating a "standard" reception function used to account for the reception of a song file or a graphic file of the first or second type. In this way, even if a file, e.g. a song file, was not ordered directly by means of the reproduction system, but by other means such as, for example, the server or an Internet site connected to the server, the reception of this file may be taken into account by the reproduction system.

When the order of a file has been validated, a fourth module of the operating system handles the management of the link with the remote server. For this, as soon as a communication is connected with the server, the fourth module creates a specific file comprising the identification of all the files ordered on the reproduction system. After the server checks any rights authorising the downloading of files onto the reproduction system or not, the requested files are sent to the requesting reproduction system. The files are sent in data packets.

Figure 1 represents a logic diagram of the file reception process according to the invention. In the process according to the invention, a first step 10 consists of initialising the communication between the server and the reproduction system to perform the file transfer. Then, the process comprises a step 11 consisting of opening a reception file on the storage means. According to the invention, the storage area selected is a permanent storage area wherein the memory available has a specified minimum size. In this way, unlike the prior art, the data is not stored in a

specific temporary storage area, but in any area of the storage means, provided that this area has a specified minimum size. After the file has been opened, during a third step 12, a "telecommunication" module of the operating system, is set to standby for a data packet.

Then, during a reception step 13, the data contained in the packet received is copied to the open file. A checking step 14 checks whether the packet that has just been copied is the last packet of the file being received. As long as the last packet of the file being received has not been received, all the data packets of the same file are copied to the previously opened file. When the last data packet of the file is detected during the checking step 14, the operating system telecommunication module creates, during a sixth step 15, a notification that it then sends to the fourth module managing the link with the server. This notification informs the fourth module that a new file has been received. As soon as this notification is received, the fourth module switches from a standby step 20 to a search step 21 in all the reception functions created, to find whether any of them relate to the file received. Similarly, the fourth module also searches to find whether a standard reception function exists.

The search is carried out by means of the name of the file received and/or by means of its extension. Indeed, each reception function is specific, either to a specific file or to a file type. Consequently, using the name or extension of the file received, the associated reception function can easily be located by the fourth module. When the fourth module locates the function corresponding to the file received, it is then activated

during a ninth step 22 to start the processing of this new file. For each file related to a song, a first reception function is activated during a tenth step 24, and for each file related to an image, a second reception function is activated during an eleventh step 23. The processing of a song file or image file essentially consists of copying the file received to an appropriate memory area and then updating the reproduction system's database. If no reception function is located by the fourth module of the reproduction system, the process is stopped and no other action or operation is carried out on the file received.

Figure 2 represents the logic diagram of a representative song file reception function. In a first step 30, the reception function checks in the reproduction system's database whether the file already exists. If it exists, the new file is copied over the old one in a second step 31, such that the old file is deleted, if the file does not exist, the new file is stored in memory, in a third step 32, to an appropriate area of the storage means, e.g. to a specific directory. Then, the function checks, in a fourth step 33, whether the new file was copied correctly. If this is not the case, the function, in a fifth step 302, deletes the file received. If the new file was copied correctly, the reception function updates the database. This update comprises, in a sixth step 34, a search in the file received, for the data to update the database. Then, using the data found, the reception function checks, in a seventh step 35, that the associated graphic files exist. Similarly, the reception function checks whether the versions of the song file and associated graphic files

are compatible with each other and with the operating system version. Otherwise, the operating system is not updated or the new graphic files are ordered, for example, according to the process described in the
5 European patent request No. 99 401 785.3.

Then, in an eighth step 36, the reception function updates the database to account for the associated graphic files. In a ninth step 37, the reception function adds to an event table in the reproduction system's
10 database that a new song file has been received.

In a tenth step 38, the reception function updates a file stored on the reproduction system, comprising the identification of all the songs available on the reproduction system. Each song is, for example,
15 identified by means of a single number. This file is used by the server to detect the list of songs available on each reproduction system connected to the server. In this way, the server can detect the list of songs present on the reproduction system by requesting, during a
20 communication with the reproduction system, the latter to send the file containing the list of songs. In this way, the server simply needs to extract the song numbers contained in this file to find out the songs available on the reproduction system.

25 In an eleventh step 39, the reception function adds an entry to a statistics table in the reproduction system's database. This statistics table makes it possible to determine how many times the song corresponding to the new file received is selected. In a
30 twelfth step 301, the reception function updates a purchase table in the reproduction system's database. This purchase table is used, for example, to check that

the number of songs ordered is less than a specified number or to bill the songs ordered. Then, the reception function carries out the fifth step 302 consisting of deleting the file received at its original location.

5 Indeed, the file received in the second 31 or third step 32 is copied to a specified memory area. Consequently, the file received is kept in its initial location throughout the database update steps. After this update, the initial version is of no further use and, 10 consequently, may be deleted. The reception function ends with a thirteenth step 303 consisting of updating the number of songs that can be selected by a customer on the reproduction system. This number is stored in memory on the system storage means to be compared to a specified 15 threshold. When the number is equal to the threshold, this means that the reproduction system comprises a maximum number of songs that can be selected and that it is therefore not possible to order others without deleting at least one song beforehand.

20 Figure 3 represents the logic diagram of a representative album cover file reception function. According to the invention, the processing of graphic files of the first and second types is identical. The graphic file reception function checks, in a first step 25 40, the integrity of the file received. In a second step 41, the reception function checks in the reproduction system's database whether the graphic file already exists. If it exists, the new file is copied, during a third step 42, over the old file, such that the old file 30 is deleted. If the file does not exist, the new graphic file is copied, during a fourth step 43, in an appropriate area of the storage means, e.g. to a specific

directory. Then, the function checks, to a fifth step 44, whether the new file was copied correctly. If this is not the case, the function, in a sixth step 46, deletes the file received. If the new file was copied correctly, the reception function, in a seventh step 45, updates the database. This update consists of indicating the name of the new graphic file, and the songs to which it is linked, i.e. the songs belonging to the album represented by the graphic file. All this data is either available in the graphic file or available in an archive table in the database.

In this way, the file reception process according to the invention is characterised in that it comprises:

- a step consisting of initialising a link between the central server and an audiovisual data reproduction system,

- a step consisting of storing files sent by the central server on storage means of the audiovisual data reproduction system, each file comprising specified information representative of the type of data contained in the file,

- a step consisting of searching, for each file received, a specific reception function, this search step being carried out by means of the specified information representative of the type of data contained in the file,

- a step consisting of processing each file by the corresponding reception function, the processing comprising copying of the file received to a specified storage area.

In another embodiment, the storage step consists of opening a file in any permanent memory area with an

available area of a specified minimum value, to write the data sent.

In another embodiment, the processing step comprises the update of a database of the audiovisual data reproduction system to account for the data contained in the file received.

In another embodiment, the search step is activated when the last data packet corresponding to a whole file is stored in memory.

In another embodiment, the specified information comprises the file extension and/or the name of the file received.

In another embodiment, when the specified information represents a song file, the database update step comprises at least one of the following steps:

- a step consisting of checking the compatibility of the version of the song file with the version of the reproduction system operating system,
- a step consisting of updating a file stored on the reproduction system containing the identification of all the songs stored on the reproduction system,
- a step consisting of updating a statistics table in the database making it possible to determine the selection frequency of the song corresponding to the file stored in memory,
- a step consisting of updating a purchase table containing the number and name of all the songs purchased for the reproduction system,
- a step consisting of updating a counter of songs that can be selected to check that the number of songs that can be selected is not greater than a specified threshold.

5